

ROBERT J. STERNBERG

# SUCCESSFUL INTELLIGENCE

HOW PRACTICAL

AND CREATIVE

INTELLIGENCE

DETERMINE

SUCCESS IN LIFE

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A PLUME BOOK

## The Role of Creative, Analytical, and Practical Intelligence in Creativity

I define creativity not only as the ability to come up with new ideas. I believe it is a process that requires the balance and application of the three essential aspects of intelligence—creative, analytical, and practical, the same aspects that when used in combination and balance make for successful intelligence.<sup>4</sup>

The first and most important aspect of creativity is *creative intelligence*, which is the ability to go beyond the given to generate novel and interesting ideas. Often, someone who is creative is a particularly good synthetic thinker, seeing connections (syntheses) other people don't see. Creative intelligence is an important part of creativity in general, but it is not the whole thing.

The second aspect of creativity is *analytical intelligence*, the ability to analyze and evaluate ideas, solve problems, and make decisions. All people—even the most creative among us—have better and worse ideas. But creative people, in particular, must also have the ability to

analyze their own ideas and evaluate their merit. Otherwise, they are as likely to push forward in pursuit of weaker ideas as to pursue better ones. Moreover, they have to use their analytical ability to work out the implications of new ideas and perhaps to test them.

The third aspect of creativity, *practical intelligence*, is the ability to translate theory into practice and abstract ideas into practical accomplishments. An implication of the investment theory of creativity is that good ideas do not just sell themselves. We have to go out and convince other people of their worth. Anyone who has ever worked in a school will understand this principle. In a school, as in any organization, there exists an entrenched set of ideas about how things should be done. If someone proposes a new way of doing things, it is incumbent upon that person to sell the idea and to convince other people of its worth. Practical ability is also needed to recognize which of one's ideas will have pragmatic application, however it may initially be received.

Thus, creativity provides a bridge between analytical intelligence, considered in the previous chapter, and practical intelligence, considered in the next. The central span of the bridge is creative intelligence, but to be creative requires a balance among all three aspects of intelligence. The person who is high only in creative intelligence may come up with innovative ideas but will not recognize which are good ones and will not know how to sell them, in any case. The person who is high only in analytical intelligence may be an excellent critic of other people's ideas but is not likely to generate creative ideas of his or her own. The person who is high only in practical intelligence may be an excellent salesperson but will be as likely to sell ideas (or products) of little or no value as to sell genuinely creative ones. In promoting creativity, therefore, we need to provide a balance of these three skills.

This idea of balance is particularly important in my concept of successful intelligence. Our society is preoccupied with amounts. More is better. More money is better, more food is better, more intelligence is better. Many cultures, however, especially Eastern ones, put greater emphasis on balance than on amounts. Successful intelligence is at least as much a matter of balance as amount, both in the

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development of the necessary skills and in knowing when to use them.

This balance applies equally to the use of creative skills. No one is more supportive of the importance of creativity than I am. Yet creativity needs to be balanced against practicality. Some ideas are creative, but they are not practical. Moreover, there is a time and place for creativity. My son has a creative turn of mind and will often champ at the bit when confronted with boring school assignments. Yet these assignments must be done, unless there is some compelling reason not to do them. I tell my son to choose his battles carefully. If he believes an important principle is involved, he should by all means fight for it. But a lot of creative people lose their support because they fight every little battle and other people tire of them. Successfully intelligent people fight their battles well, but first they carefully pick the battles to fight.

We also need to promote the attitude that all three kinds of intelligence are important—that is, to remember ourselves and to teach our students that to be truly creative, it is necessary to find a balance among the creative, analytical, and practical aspects of intelligence. This *creative attitude* is at least as important as any creative-thinking skills.<sup>5</sup>

## Developing Creative Intelligence

I have never met parents, teachers, or employees who believe themselves to be suppressing creativity. On the contrary, the overwhelming majority of people want to encourage creativity in others and in themselves but often are not sure of how to go about doing so. An IQ myth is that abilities cannot be developed. The truth is that they can be.<sup>11</sup> And the best proof of that can be found by examining twelve characteristics of successfully intelligent creative people and exploring how these characteristics can be developed.

1. Successfully intelligent people actively seek out, and later become, role models. When all is said and done, the single most powerful way of developing creative intelligence in your employees, your students, or your children is to serve as a creative role model yourself. People develop creative intelligence not when you tell them to but when you show them how.

Ask yourself who the teachers are that you most remember from

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your days in school and who most affected what you became. They are probably not the teachers who crammed the most content into their lectures but rather those whose ways of thinking and acting served as role models. The teachers we remember tend to be those who balanced teaching of content with teaching us how to think with and about that content.

Occasionally, I will give a workshop on developing creativity, and a teacher, parent, or manager will ask exactly what to do and how to do it. Bad start. You cannot follow a cookbook recipe for developing creativity—first, because there is none, and second, because such a stock prescription, if it existed, would hamper creativity. To encourage creativity, you yourself have to be creative.

Successfully intelligent people, as a rule, have had good role models. It's in part for this reason that it is so difficult to take older children from poor environments, put them in a new environment, and expect sudden changes. The problem is that they have not had good role models. If we want to develop successful intelligence, the earlier we start, the better. It's never too late, but neither is it ever too early.

2. Successfully intelligent people question assumptions and encourage others to do so. We all tend to have assumptions about the way things are or should be. Usually, such assumptions are widely shared. But creatively intelligent people question many assumptions that others accept, eventually leading others to question those assumptions as well. For example, when Copernicus suggested that the earth revolves around the sun, the suggestion was viewed as preposterous because for centuries it had been assumed that the sun revolved around the Earth.

Sometimes, unfortunately, it is not until many years later, and perhaps even after the death of the creatively intelligent person, that others realize the limitations or errors of their assumptions. Yet without the impetus of those who question assumptions, little or no progress would ever be made in any human endeavor.

Teachers and parents should encourage children to question as-

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sumptions. That way, they will also encourage them to think creatively and express their own ideas about the way things are or should be. Many assumptions are, of course, valid. Even so, it is important for children, or adults, for that matter, to understand why we think or act the way we do. It is probably safe to assume that all creative thinking begins with one question: "Why?"

3. Successfully intelligent people allow themselves and others to make mistakes. Buying low and selling high carries with it a danger. Most unpopular stocks are unpopular for a reason. People think they aren't very good investments. Put another way, people often think a certain way because it's safe and they don't want to make mistakes. But every once in a while, a great thinker comes along—a Freud, a Piaget, a Chomsky, or even an Einstein—and shows us a new way to think. That is not to say that great thinkers never make mistakes. On the contrary, making mistakes is inevitable when you're exploring new territory. But they learn from their mistakes—or enable us to learn from them.

Schools tend to be unforgiving of mistakes. When children hand in workbooks, their errors are often marked with a large and pronounced X. When they answer a question incorrectly in class, some teachers pounce on them, and their classmates snicker. When children go outside the lines in a coloring book, or use the wrong color, they are corrected. In hundreds of ways in the course of their schooling, children learn that it's not all right to make mistakes. As a result, they become afraid to err and thus to risk the kind of independent, if sometimes flawed, thinking that can lead to the development of creative intelligence.

Too often we have a coloring-book mentality about the way we think. If our ideal child is the one who stays within the lines and uses the "right" colors, who is our ideal adult—the one who stays within the lines at work? Usually so. We can't reward a coloring-book mentality in our children and then hope for creativity when the children become adults.

Sometimes what may seem like a mistake on the part of a child isn't one. The response just doesn't fit conventional wisdom. Some years back, a colleague of mine, Wendy Williams, observed a class in which the teacher asked the children who discovered America, and a child blurted out, "The Indians." Everyone laughed, and the teacher hastened to correct the mistake, naming the great explorer Christopher Columbus. Today, perhaps, a teacher would not be so quick to correct such a "mistake." More to the point, however, is the realization that insisting on "right" answers and the "right" way of doing things encourages conformity, not creativity.

4. Successfully intelligent people take sensible risks and encourage others to do the same. When you buy low and sell high, you always take a risk. But creative people are willing to take that risk. They have to be, in order to produce the work that others will ultimately admire and respect. And in taking risks, creative people will sometimes fail and fall flat on their faces. We have to let them do so.

It is important to emphasize the word *sensible* in relation to risk taking, because I am not, of course, talking about the kinds of risks that endanger life and limb. Rather, I am talking about the risk that is always involved when we explore new ideas and new ways of doing things. It is the risk of being "different."

Schools, for the most part, discourage risk taking. Children learn early how the system works. To succeed, you have to get high grades, and to get high grades, you've got to stay on the straight and narrow. You need those grades to get into better sections, to be admitted to advanced courses, to get into college, and, later, to get advanced training or the best job. Risk taking, it might seem, is for suckers, because even a few low grades can put you out of the running for the greatest advancement.

When my daughter, Sara, was in third grade, the children were studying the planets, and the teacher assigned a lesson in which they were to simulate being astronauts, dressing up in astronaut fashion and pretending to fly to Mars. Sara suggested that she dress up as a Martian and meet the astronauts when they arrived. The teacher immediately told her that she couldn't do that, because space probes

had indicated there were no Martians. Sara took a risk by suggesting an interesting and creative idea, and she was shot down. Perhaps it is no wonder that it is so much easier to observe creative intelligence in young children than in older children and adults. It is not that the older individuals lack creative intelligence but rather that they have suppressed it. Only by allowing and even encouraging intellectual risk taking can we help our students, and even ourselves, unleash creative potential. Further, teachers should reward risk takers. If students take a sensible risk on an assignment or a project, they should be given credit for their creativity, even though there are ways in which their project might be improved.

5. Successfully intelligent people seek out for themselves and others tasks that allow for creativity. If the only assessment students receive in a course is a multiple-choice test, they will learn quickly enough what is valued, no matter what teachers say they value. If our schools want to encourage creativity and the display of creative intelligence, they need to include in their assignments and tests at least some opportunities for creative thought.

I teach an introductory course in psychology for college freshmen and have also designed an advanced-placement high-school psychology course. But their underlying principle can be used in any course at any level, and that is to ask in class and on examinations questions that not only require factual recall and analytical thinking but allow creative (and practical) thinking as well.

For example, I may ask students to recognize the basic tenets of existing theories of depression, but I will also ask them to synthesize existing theories and show how they might be integrated with each other and with ideas of the students to produce a new theory. I do not expect publishable new theories. My goal is to get the students to think creatively, because by practicing creative thinking they will develop their creative thinking skills.

The same principle can be applied in any course. In English, students can be asked to write short stories, poems, or even alternative endings to existing stories. In history, they can be asked to imagine that they are some figure in the past, and then to say what decisions they would have made in his or her place and why they would have made them. Or they can be asked to speculate on aspects of the future history of the world. In science, students can be asked to propose intuitive theories of phenomena, to design simple experiments, or to do independent research projects (librarily or empirically). In mathe-



matics, they can invent their own word problems or systems of enumeration or measurement. In foreign-language classes, they can be asked to create skits taking place in the foreign country, simulating not just the language but the cultural customs. Really, the only limitations in terms of assignments are the limitations in the imagination of the teacher.

6. Successfully intelligent people actively define and redefine problems, and help others to do so. A high-level executive in one of the "Big Three" automobile firms in the United States was faced with a dilemma. On the one hand, he loved his job and the money he made doing it. After all, high-level executives in Detroit are paid well, whether or not their cars are selling. On the other hand, he absolutely detested his boss. He had put up with this would-be ogre for a number of years and just couldn't stand it anymore. After carefully considering his options, the executive decided to visit a headhunter—a specialist in finding high-level executives new jobs. He went to the interview not knowing exactly what to expect, but fortunately, the headhunter indicated that there would be no problem in placing him somewhere else.

The executive told his wife about how the interview had gone and that he was confident he would find another job. After he described his day, his wife, a teacher, described hers. At the time, she happened to be working with my book *Intelligence Applied*, a program for teaching thinking skills to high-school and college students. She described the technique she had gone over that day—*redefining a problem*. The basic idea is that you take a problem you are facing and then turn it on its head. In other words, you look at the problem in a totally new way, one that is different not only from how you have seen it in the past but also from how other people would be likely to see it. As she described her lesson, the executive felt an idea sprouting in his head. He saw how he could use the technique his wife was teaching in her class to his personal advantage.

The next day, he returned to the headhunter, gave him his boss's name, and asked him to look for another job—for his boss. The

headhunter agreed, and before long he found something. When the boss received a phone call offering him another job, it happened that he was tiring of his current job, and in short order he accepted the new position. The icing on the cake was that when the boss's old job became vacant, our high-level executive applied for it and ended up with the higher-level job.

This true story—told to me by the wife of the executive—illustrates the importance of redefining problems. The executive had originally defined his problem as one of finding himself a new job. He solved it by turning the problem on its head—that is, by finding his boss rather than himself a new job.

A couple of years ago, I faced an annoying problem. Every morning, I would wake up and discover garbage strewn all along my driveway. Opened, overturned garbage cans provided what seemed to be the obvious clue. A raccoon had knocked the can over and was eating the garbage. The problem was how to trap and remove the raccoon.

The solution seemed obvious. I went to the local hardware store and bought a trap designed not to hurt the raccoon. You put bait (such as the contents of a can of sardines) in the center of the trap, open the side doors, and place the trap near the garbage cans. As soon as the raccoon enters to eat the bait, the doors slam shut and the animal is trapped. You then drive out to some country road and release the raccoon.

I followed the prescribed steps and assumed I had solved my raccoon problem. However, my garbage cans continued to be overturned every night. The doors of the trap had closed and the bait had been eaten, but there was no raccoon inside. Apparently, the animal was able to enter the trap and eat the bait without stepping on the spring mechanism that closed the doors. I was dealing with a very smart raccoon.

I decided to redefine the problem and find a professional animal trapper to do the job. I called one, and he came to the house with a bunch of traps that looked curiously like the one I had used. He placed the traps, with bait inside them, in the area occupied by the

garbage cans, and indeed they trapped animals—several squirrels and my neighbor's cat. It was two hundred ten dollars later, and I had yet to see a trapped raccoon.

Further information about the problem became evident one morning around three, when I was awakened by a loud, clanging noise that emanated from the area of the garbage cans. I got up and saw an enormous dog reaching his paws inside the trap. The doors had closed, but not completely. Thus, the dog was able to pull out the bait, and the doors shut only after it had departed. Basically, I had not solved my raccoon problem because there was never any raccoon. Redefining the problem once more, I went to the hardware store and bought garbage cans with handles that locked the lids. Indeed, the dog was unable to open the lids, and the problem was solved. But several months later, the new garbage cans were attacked by the real thing—hungry, clever raccoons, which, unlike the dog, had no trouble opening the lids and eating the garbage.

Not one to be beaten out in a test of wits by raccoons, I bought a few bungee cords and crisscrossed them over the top of each can. After several days, however, the raccoons had figured out how to get through the cords. Eventually, I solved the problem by redefining it one last time. I built an enclosure with locking doors that completely surrounded the garbage cans—this the raccoons could not enter. And from that day to this, even though it took much trial and error to solve the problem, only the trash collectors and I can get to those cans.

My raccoon problem may seem mundane, especially in the context of creative thinking. But successful intelligence can find application even in mundane contexts. It's not only about once-in-a-generation ideas such as few of us ever have, like Einstein's theory of relativity. It's also about solving problems, making decisions, and improving situations in our daily lives. Creatively successful intelligence is in the everyday turn of mind, not just in occasional flashes of genius.

One way you can encourage creative intelligence is by allowing people to choose their own ways of solving problems and, sometimes,

to choose again when they learn that their selection was mistaken. For example, I often require several brief papers in my courses, and I allow students to choose their own topics for at least one of these papers, subject to my approval only to make sure that the topic is in some way relevant to what I am teaching and that the paper has at least a chance of being completed successfully. Obviously, students should not *always* choose. There are particular topics that teachers believe they need to explore. But if they are *never* given the opportunity to choose, they will never learn how to do so.

Choice should be taken seriously. In the project fair at a school, each child got to choose the state of the United States about which he or she would do a project. Not much of a real choice. The more latitude you give students, the more they will learn how to choose wisely the problems and projects they want to pursue, an essential element of creativity.

7. Successfully intelligent people seek rewards for, and themselves reward, creativity. I explicitly reward creative efforts among my students. For example, when I assign papers, I tell them that I will look for the usual things—namely, a demonstration of their knowledge, their display of analytical skills, and, of course, good writing. But above and beyond that, I will look for and reward creativity. The question is not whether I agree or disagree with what they will say, but whether they come up with new ideas that represent a synthesis between ideas they have heard or read about and their own ways of thinking.

Some teachers complain that they cannot evaluate creative responses with the same objectivity they apply to multiple-choice or short-answer tests. At one level, of course, they are correct. There is some sacrifice of objectivity. But our research, as well as that of others, shows that evaluators are remarkably consistent in their assessments of creativity.<sup>15</sup> Moreover, our main goal in assessment really ought to be instruction—students learn through assessment, just as they do through any kind of instruction. Better that students do

creative work that is evaluated with somewhat less objectivity than that they never be allowed to do creative work, just so that teachers can maintain the semblance of objectivity in evaluation.

8. Successfully intelligent people allow themselves and others the time to think creatively. We are a society in a hurry. We love fast food, we rush from one place to another, and we value quickness. Indeed, to say that someone is quick is one way to say the person is smart, which squarely shows where we place our values.<sup>16</sup> Moreover, our standardized tests tend to have large numbers of (usually multiple-choice) problems squeezed into very brief time frames. Who would have time to think creatively, even if they were allowed to?

Contrary to popular myths, most creative insights do not happen in a flash.<sup>17</sup> People require time to understand a problem, mull it over in their minds, and come up with a creative solution. If teachers stuff questions into exams, or give students so many homework assignments that they scarcely have time to complete any of them, they will not have the time they need to think creatively. If employers never give employees time to think, the resulting work will not be, on average, creative.

Unfortunately, very heavy demands are placed upon teachers in the United States, and they are given substantially less free time than, say, in Japan.<sup>18</sup> The result is that the teachers, like the students, have scarcely any time to think, much less to think creatively. If we want students, or people in the workplace, to develop creative thinking skills, they have to be given time to do so.

9. Successfully intelligent people tolerate ambiguity and encourage tolerance of ambiguity in others. Americans, as a general rule, have a low tolerance for ambiguity. Historically, we have always liked things to be delineated in black and white. We like to think that one way of doing things is "right" and another "wrong," or that a certain idea is "good" or "bad." The problem is that in the realm of creative work, there is usually a period of time when there are a lot of grays.

And even when things are worked out, a creative idea, like any other, may have its pluses and minuses.

The development of a creative idea almost always takes time, and during that time we tend to be uncomfortable and impatient. You want the solution now, when you have only half of it. Without time or the ability to tolerate ambiguity, you may jump to a nonoptimal solution prematurely. Linus Pauling lost credit for the discovery of the structure of DNA because he was not able to tolerate ambiguity quite long enough. He had a structure, but it was not quite the right one. He published the structure—a helical one—and his notion provided some of the missing pieces Francis Crick and James Watson needed to complete their work on the right structure.

Creative writers learn to live with ambiguity, especially when they are not quite certain how their work is going to turn out. In regard to his novels *Night Rider* and *At Heaven's Gate*, Robert Penn Warren said, "What I want to emphasize is the fact that I was fumbling rather than working according to plan and convictions already arrived at."<sup>19</sup>

Even the study of the physical sciences has its ambiguities. In the eighteenth century, Antoine Lavoisier, a founder of organic chemistry and biochemistry, had very imprecise measuring tools. As a result, he worked with "messy," ambiguous data and had to decide which observations were meaningful and which were not. Lavoisier "lived with incoherence" for long periods.<sup>20</sup> For example, in his work on oxidation and combustion, he grappled for two years with contradictory characterizations of air as either a single changeable substance or as a composite of several basic substances.

Because ambiguity is uncomfortable and anxiety-provoking, people strive to resolve it. Moreover, the pressure for resolving it is often not completely internal. Your employer or your partner in a relationship may put as much or more pressure on you than you yourself do. The employer may need to get the new product out. The spouse may be uncomfortable not knowing how you really feel about your relationship. The publisher may want the novel tomorrow and not next year. From all sides, therefore, you may be experiencing pressure to get the damn thing—whatever it may be—over with.



But to make the most of our creative potential, we need to be able to tolerate the discomfort of an ambiguous situation long enough so that what we produce is the best or closest to the best we are capable of. Any number of products have come on the market—cars, books, pens, or whatever—that weren't quite right. If the company had waited just a bit longer, it might have made a better product. Sometimes, in business situations, a competitor steps in and does get it right. And what could have been a stunning success becomes a modest one, or even a failure.

When a student has almost the right topic for a paper, or almost the right solution to a difficult math problem, it is tempting to just say go with it and accept the near miss. When a manager makes almost the right decision, he will probably stick with it. When a person looking for a new house sees almost the right house, or the person looking for a partner finds almost the right partner, it's tempting to call it quits and end the search. Creative intelligence includes a tolerance for ambiguity and a willingness to take all the time necessary to come up with good solutions and make good decisions.

10. Successfully intelligent people understand the obstacles creative people must face and overcome. Creative people *always* encounter obstacles. It's the nature of the enterprise. When medical scientists first proposed that the reason antacid drugs were not particularly effective against ulcers was that ulcers were caused by bacteria rather than stomach acids, the pharmaceutical companies were not standing in the wings, waiting to be told that their multimillion-dollar investment in antacids was in vain.

Creative thinking almost inevitably encounters resistance. The question is not whether it will encounter resistance but whether the creative thinker will have the fortitude to persevere in the face of it. I used to wonder why so many young and promising creative thinkers disappear into the woodwork. Now I better understand. Sooner or later, they give up. They decide that being creative isn't worth the effort, especially when they find that creativity is punished rather than rewarded. Yet the truly creative thinkers who stay the course and

are willing to pay the short-term price will, in the long term, reap the richest rewards.

11. Successfully intelligent people are willing to grow. Once a person has a major creative idea, the tendency may be to stop there and spend the rest of a career following up on that idea. It is frightening to contemplate that the next idea may not be as good as the last one, or that the success to which one has become accustomed may disappear with the next idea. Or we simply become complacent and stop being creative.

Complacency can also come about because of our own expertise. We can become so comfortable with it that we assume we know all there is to know and stop growing. We come up with no new ideas and are reluctant to consider new ideas from others. Meanwhile, the world has passed us by.

Several years ago, I visited a famous psychologist in another country. He wanted to show me the zoo in his city, so we went there and headed for the cages of the primates. As it turned out, just as we reached the cages, the primates were engaging in what could euphemistically be called "strange and unnatural sexual behaviors." Being New Jersey born and bred, I of course turned away. But the man I was with didn't have my refined breeding. He stared intensely at them and, a few minutes later, began analyzing their behavior in terms of his theory of intelligence.

There are very few things I think I know for sure, but one of them is that whatever it is that motivates sexual behavior, it has nothing to do with that man's theory of intelligence. And I started to wonder how such an intelligent man could seriously believe that it did. Then I realized that he, like so many other experts, had succumbed to tunnel vision. You come up with an idea that works, and soon you're trying to apply it to everything, whether it is appropriate or not.

We can all fall into that trap. For example, my theory of intelligence has three parts. A couple of years after I proposed it, I proposed another theory, a theory of love, that also had three parts. Then came a three-part theory of creativity. Soon people were asking me why all

my theories had three parts. I told them that there were three good reasons. I intended the remark as a joke, but I could see that I too had become entrenched.

We often encounter examples of the costs of knowing too much in everyday life, but is the phenomenon demonstrable under the more carefully controlled conditions of a laboratory? Peter Frensch and I tried to show in such controlled conditions that being an expert can actually hurt you under certain circumstances.<sup>21</sup> Our experiments involved having expert and novice players compete against a computer in a game of bridge. Since computers can be programmed to play quite well, it is no mean challenge, even for experts. In one of the experiments, both experts and novices played bridge against a computer, while the computer kept score. It will come as no surprise that the experts played better than the novices. But the point of the experiment was not merely whether experts play better than novices (of course they do) but rather the effects of knowledge on how people play.

In addition to a standard-play condition, there were two other conditions of play. One was a "surface-structural" change condition, in which people played bridge against the computer but the form of the game was slightly altered. What was altered was either the rank ordering of the suits (which is, normally, from lowest to highest, clubs, diamonds, hearts, spades) or the names of the suits, which were changed to made-up words, such as "gleebs," "fricks," and so on. We called these changes "surface-structural" because they altered only the most superficial aspects of the game, and the new conditions of play could be mapped in a one-to-one fashion to the old conditions. Nothing fundamental about the game was really different. When the players were subjected to this surface-structural alteration, their play suffered momentarily but quickly recovered. All they had to do was learn the new order or names of the suits. And again, experts played better than novices.

In a "deep-structural" change condition, a more fundamental change was made. The game of bridge starts with a bidding phase

and then converts into a playing phase that occurs in a number of successive rounds. The player who puts out the high card in a given round takes the trick and is normally the one who leads off play in the next. Our deep-structural change made it so that the player who puts out the low card takes the trick and leads off the next round. To total novices, the change would make little difference. It wouldn't disrupt their complex strategies of play because they didn't have any. But experts who had developed such strategies would be more likely to be disrupted, because they could no longer use them.

The results came out exactly as predicted. Experts were more hurt by the deep-structural changes than novices. Although the experts eventually recovered, it was hard for them because they were used to their normal strategies of play. Thus, their expertise got in the way of their adapting to the new rules.

As we age, we face the issue of growing not only older but, potentially, more set in our ways—more entrenched. For example, there are trends in my own field, psychology, that I don't like. I see the field as leaping from one bandwagon to the next. But is it the field, or my own inability to keep up? I can never really know for sure, but I have to be aware of both possibilities.

I tell my students that we have an equal exchange. My advantage over them is knowledge. To be creative, you have to be knowledgeable about a field. You can't move a field beyond where it is if you don't know where it is. But the advantage my students have is flexibility. Precisely because they know less, they are not as likely to be set in their ways. If they listen to me, but I listen also to them, we both profit from the exchange. In the same way, senior managers can learn by listening to junior managers who don't yet have a vested interest in the systems that are currently in place.

Occasionally, I may not like a student's or a junior colleague's idea. I'll tell the person as much. But I'll also encourage the person to try the idea out on me again, perhaps in a few weeks. I may see value in the idea a few weeks later that I didn't see the first time. And even if I don't, I won't conclude that the idea is no good. I'll encourage the

person to get feedback from others. Someone else may see in the idea something I didn't see. We don't throw away creative ideas in my work group, because I won't let us.

When I was a graduate student, a world-famous psychologist came to deliver a talk, and he prefaced it by saying that he had funded his latest research himself. No one wanted to fund him. Why? Because the work was in an area different from the one in which he traditionally worked. The funding agencies were willing to let him work in his usual area but not willing to trust him in a new one; they had placed him in a box and did not want him to step outside it. Deciding to step outside it anyway, he later became famous for work in the new area and then easily obtained the funding he needed.

We are all susceptible to becoming victims of our own expertise, entrenched in ways of thinking that may have worked for us in the past but will not necessarily do so in the future. Being creative means that we are willing to step outside the boxes that we as well as others have built for ourselves, before we become trapped inside.

12. Successfully intelligent people recognize the importance of person-environment fit. The last strategy is one that is as important to teachers and parents as it is to students. It stems from the fact that creativity is not really an objectifiable phenomenon. What is judged as creative is an interaction between a person or persons and the environment in which they work.<sup>22</sup> The very same product that is rewarded as creative in one time or place may be scorned as pedestrian in another.

Some years ago, I had a very talented graduate student who received two job offers, one from a highly prestigious institution, the other from a good but less prestigious one. The highly prestigious institution, however, did not seem particularly to value the kind of creative work the student did, whereas the less prestigious institution did seem to be such a place.

I gave the student what was probably the worst advice I ever gave anyone. I recommended that he take the prestigious job, because if he didn't, he would always wonder whether he could have made it in

that place. Unfortunately, the student took the advice and did all right, but probably not as well as he would have done at the other place. There is a lesson to be learned. Find the environment that rewards what you have to offer, and then make the most of your creativity and of yourself in that environment.

A good example of environmental misfit can be found in the movie *Dead Poets Society*. A teacher who is clearly very creative is judged incompetent by the school in which he works, and he has to leave. This story is repeated many times daily, in many settings. Because there is no absolute standard for what constitutes creative work, the same lesson, school-reform idea, or student product that is valued in one setting may be devalued in another. People to whom that happens should look for a setting in which their creative talents will be encouraged and their unique contributions as creative thinkers rewarded rather than punished.

We all should be encouraged to develop our creativity in the areas where we have a contribution to make. We need an environment that lets us capitalize on our strengths. Research shows that people do their most creative work when they love what they do.<sup>23</sup> Too often, young people follow one career path or another not because it is what they love but because it's what other people, usually their parents, want. They may do good work in such a career path, but they probably won't do great work and almost certainly won't do creative work.

It is very unfortunate that we do not do more to encourage and develop creative intelligence. Even the most unimaginative and convention-bound parents or teachers want their children or students to succeed. If anything, our society worships success—but usually after the fact, without giving much thought to *how* it was achieved. There can be, of course, many contributing factors, but creative intelligence is always part of the mix.